

Remarks/Arguments

Applicant wishes to thank the Examiner for the careful review of the claims, specification and drawings.

Claims

Independent claims 39 and 50 have been amended.

Claims 40-49 and 52-59 have been amended to correct typographical errors.

After entry of this amendment, claims 39-59 are pending.

It is respectfully submitted that each and every feature recited in the claims are fully supported in the specification as filed. No new subject matter has been added.

Discussion of New Claims

Applicant hereby amend independent claim 39 and 50, as followed:

39. (Currently Amended) A method for determining a status of a component of a plasma processing system comprising:

identifying a set of variables, the set of variables including at least one parameter of the component, the at least one parameter of the component pertaining to the status of the component;

formulating an impedance as a function of the set of variables;

operating the plasma processing system using a plurality of signals associated with different frequencies, at least two of the plurality of signals being provided to the plasma processing system at different times;

measuring a set of voltage values, a set of phase values and a set of current values associated with at least one of an upper electrode and a lower electrode of the plasma processing system for the plurality of signals;

calculating a set of values of the impedance using the set of voltage values, the set of phase values, and the set of current values;

forming a set of equations using the function and the set of values of the impedance; and

solving the set of equations to obtain a value of the at least one parameter of the component, the value of the at least one parameter of the component reflecting the status of the component.

50. (Currently Amended) A plasma processing system comprising:

a monitored component;

a signal generator configured to generate a plurality of signals associated with different frequencies, at least two of the plurality of signals being provided to the plasma processing system at different times;

an electrical measuring device configured to measure a set of voltage values, a set of phase values, and a set of current values associated with at least one of an upper electrode and a lower electrode of the plasma processing system for the plurality of signals; and

at least one computer device configured to: (a) store a mathematical relation between an impedance and a set of variables, the set of variables including at least one parameter of the monitored component, (b) calculate a set of values of the impedance using the set of voltage values, the set of phase values, and the set of current values, and (c) calculate a value of the at least one parameter of the monitored component using the mathematical relation and the set of values of the impedance.

Support of the amended feature of measuring the set of phases and employing the set of phases in the calculation of impedance to independent claims 39 and 49 can be found in, for example, [0032], [0034] and [0055] as well as in equation 10 of the specification.

The Office Action has cited Sneh (US Patent 5,863,376) and Mictrovic (US Patent Publication 2005/0067386) as references.

Applicant respectfully submits that neither Mitrovich and/or Sneh discloses or suggests the feature of measuring the phases and employing the measured phases in the calculation of the impedances in the manner claimed.

Specifically, Sneh discloses Synchronously Modulated Flow Draw methods and systems for providing uniform and symmetrical chemicals in chemical deposition processes that are different from the method of claim 39 for determining a status of a component and the plasma processing system of claim 50 with capability of monitoring a component.

Mitrovic discloses a method for calculating a plasma load impedance (Z_L) using an equivalent impedance (Z_{eqv}) measured using a VI probe and three lumped impedances (Z_1 , Z_2 , and Z_3) calculated based on simulations. (P. 3, Paragraphs [0026]-[0028]). However, there is no disclosure or suggestion in Mitrovich that phases should be measured and employed in the calculation of the impedances in the manner claimed.

As such, Applicant respectfully submits that the amended claims 39 and 50 are novel, nonobvious, and patentable. It is also respectfully submitted that claims 40-49 which depend from amended claim 39 and claims 51-59 which depend from amended claim 50 are also novel, nonobvious, and patentable not only due to their recitations of independently patentable features (such as, for example, incorporating electrical properties of a signal generating or measuring device in a mathematical relation of an impedance and at least one parameter of the component of the plasma processing system as in claim 47 or 48) but also due to their dependence from the patentable parent amended claims 39 and 50, respectively.

For the aforementioned reasons and others, it is respectfully submitted that the pending claims are novel, non-obvious, and patentable over the cited arts of record, taken alone or in combination. No new subject matter has been added.

Conclusion

In view of the discussion herein, Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at 408-257-5500.

A three-month extension of time is petitioned for the submission of the present amendment. If any other petition is required to facilitate the entry of the present amendment, please consider this communication a petition therefore as well. The Commissioner is authorized to charge any fees which may be required, including the extension of time fees, or to credit any overpayment, to Deposit Account No. 50-2284 (Order No. LMRX-P034/P1233).

Respectfully submitted,

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